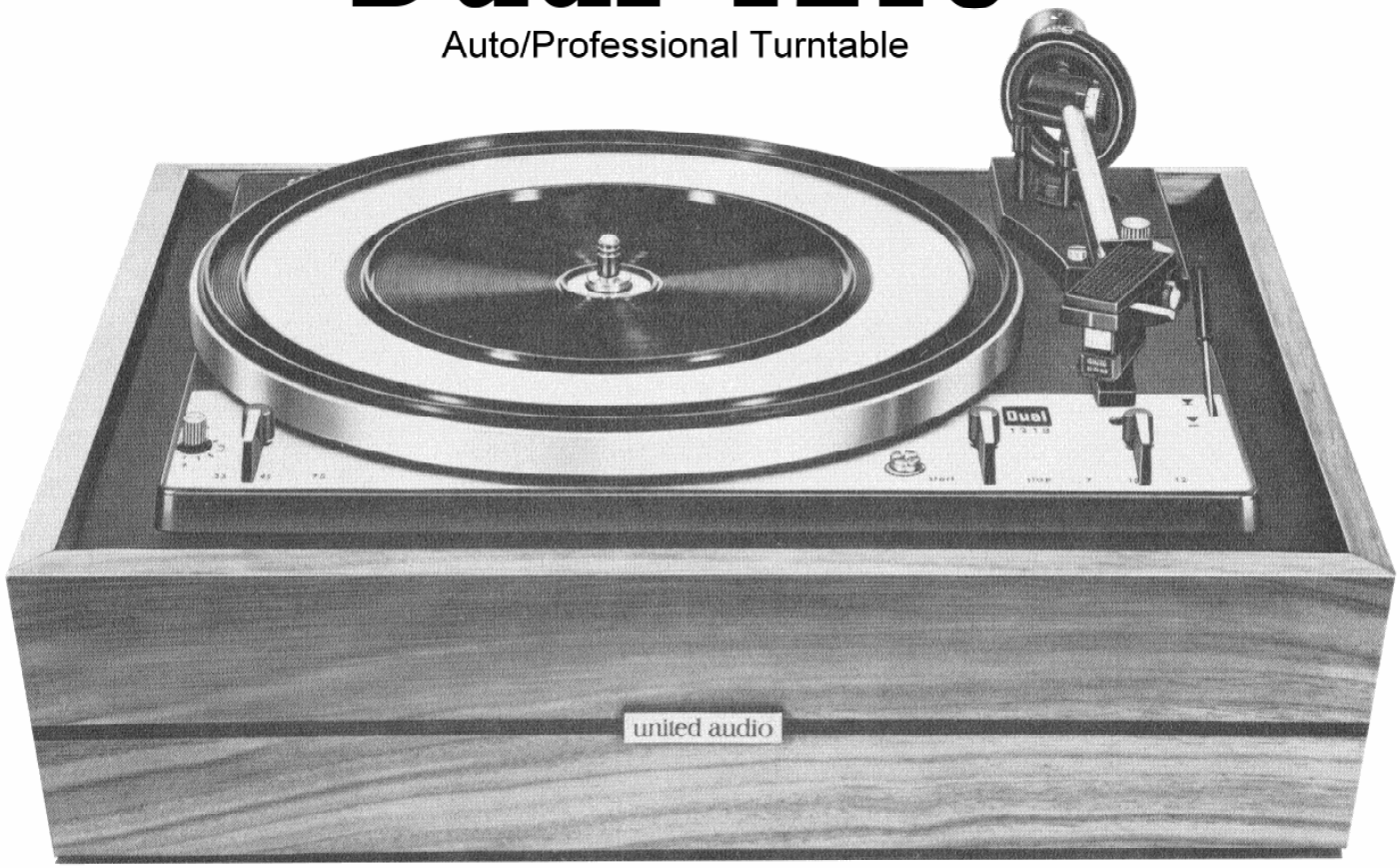
Dual 1218

Auto/Professional Turntable



Dual

Owner's Manual

Introduction

If you are typical of most new owners, you probably want to connect your Dual with the least possible delay, and then hear it play. We understand.

But any new turntable or changer needs to be unpacked and installed on its base. Then the cartridge must be mounted, the tonearm balanced, and the entire unit connected to the rest of the system.

On pages 4 and 5 you will find instructions and illustrations for these steps which we hope you will find easy to follow. If you open this flap, you will find a photograph of the 1218 with each feature identified. Operating instructions are on page 9.

Beginning on page 6 you will find detailed descriptions of the various engineering and operating features of the 1218.

We have included these descriptions because we have learned from previous Dual owners that they like to learn even more about their Dual after they've bought it than they did before.

Good listening.

Dual
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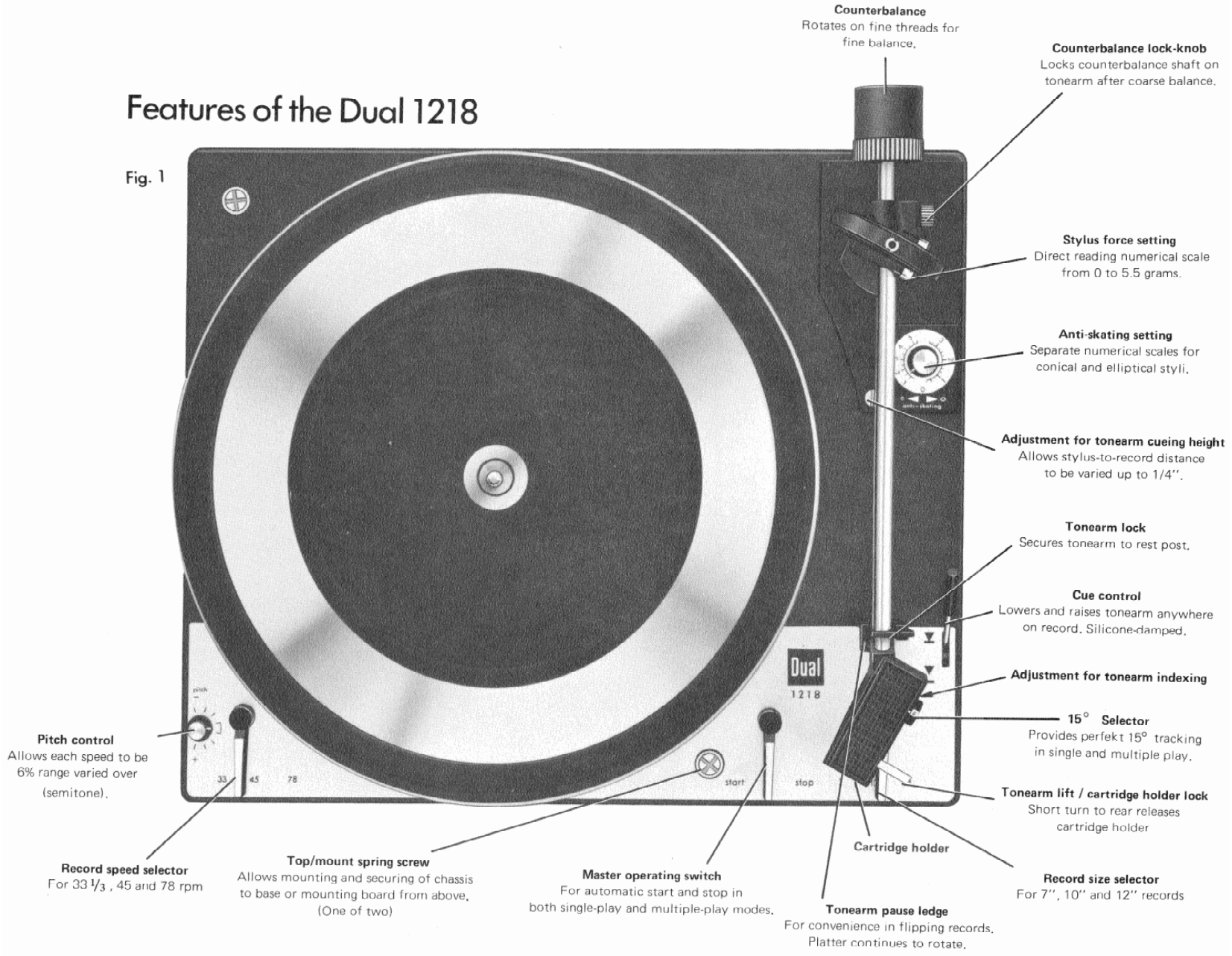
Features of the Dual 1218

Fig. 1


Counterbalance
Rotates on fine threads for fine balance.
Counterbalance lock-knob
Locks counterbalance shaft on tonearm after coarse balance.
Stylus force setting
Direct reading numerical scale from 0 to 5.5 grams.
Anti-skating setting
Separate numerical scales for conical and elliptical styli.
Adjustment for tonearm cueing height
Allows stylus-to-record distance to be varied up to 1/4".
Tonearm lock
Secures tonearm to rest post.
Cue control
Lowers and raises tonearm anywhere on record. Silicone-damped.
Adjustment for tonearm indexing
15° Selector
Provides perfekt 15° tracking in single and multiple play.
Tonearm lift / cartridge holder lock
Short turn to rear releases cartridge holder
Record size selector
For 7", 10" and 12" records
Pitch control
Allows each speed to be 6% range varied over (semitone).
Record speed selector
For 33 1/3, 45 and 78 rpm
Top/mount spring screw
Allows mounting and securing of chassis to base or mounting board from above. (One of two)
Master operating switch
For automatic start and stop in both single-play and multiple-play modes.
Tonearm pause ledge
For convenience in flipping records. Platter continues to rotate.
Cartridge holder
Dual
1218
pitch
33
45
78
start
stop

Installation instructions

Dimensions required

The required cut-out is shown on the template supplied. This cut-out is also provided in bases designed for your Dual, and available from any authorized Dual dealer. External dimensions of the chassis are 10¾" x 13". Allow 1" additional at the rear for the tonearm overhang. (2¾" clearance below the chassis is required) and approximately 5" above for inserting the multiple-play spindle.

Mounting on base

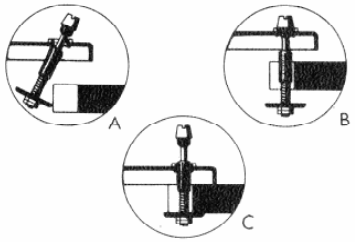


Fig. 2. 3-position mounting screw.

Each of the two mounting screws has three positions, that allow you to install, remove and secure your Dual from the top. (Fig. 2.)

1. With the screws in their loose position, hold the chassis over the base so the four spring-mounted footings will be over their cut-outs. Tilt the mounting screws to let them slip past the notches as you lower the chassis. (Fig. 2A.)

2. Turn each screw clockwise until it is firmly seated in the top of the chassis. (Fig. 2B.)

3. To remove the Dual, reverse the above procedure.

4. To secure the Dual to the base for transport, loosen the mounting screws, depress the chassis against the base, then continue to turn the screws counterclockwise until they tighten the chassis to the base. (Fig. 2 C.)

Note: When carrying the Dual for any distance, it is important to either remove the platter or to insert the plastic wedges (supplied in the accessory bag) between the platter and chassis. This is to prevent possible damage by the platter bouncing against the shaft and bearings.

Removing the platter

If you ever want to remove the platter, use the special cone device supplied in the accessory bag. The same cone is used to replace the springclip. (Fig. 3.)

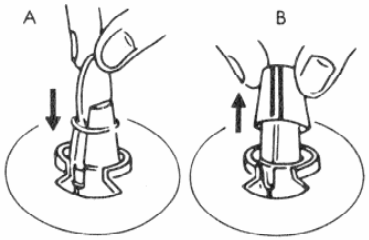


Fig. 3. Cone for inserting and removing spring-clip for securing platter to chassis.

Mounting the cartridge

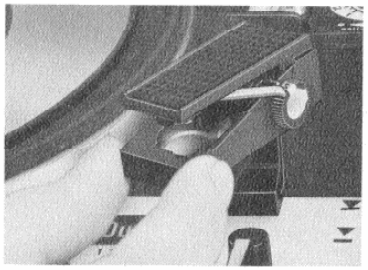


Fig. 4. Cartridge holder with mounted cartridge. When inserting, place upper rear edge along tonearm head first, then lift up before locking by pressing tonearm lift forward.

1. Release the cartridge holder from the tonearm head by pressing the tone-arm lift a short turn to the rear. Be ready to catch the holder, as it will drop right into your hand. (Fig. 4.)

2. From the hardware supplied with either your Dual or with your cartridge, select a pair of spacers and screws that will place the stylus tip at the correct depth from the top of the holder. The special gauge supplied with your Dual, when held against the holder as shown in Fig. 5, will give you this proper depth for the correct vertical tracking angle (5A), plus the correct stylus overhang position (5B) for minimum horizontal tracking error. When the stylus is at the correct depth and position, it will be centered in the notch of the gauge.

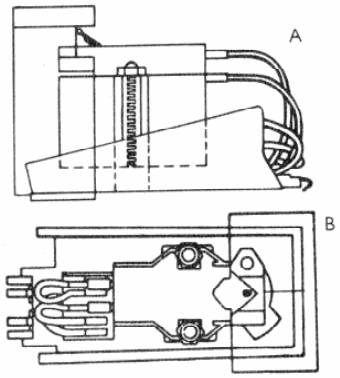


Fig. 5. Gauge for checking correct depth of cartridge and overhang of stylus.

3. Before tightening the cartridge, also be sure that it is positioned at a right angle to the front edge of the holder.

4. Connect each lead on the cartridge holder to its corresponding pin on the cartridge. Each lead is color-coded as shown in Fig. 6.

5. Attach the cartridge holder by placing it against the tonearm head as shown in Fig. 4, lift it up flush against the bottom of the tonearm head, then lock it by pressing the tonearm lift forward.

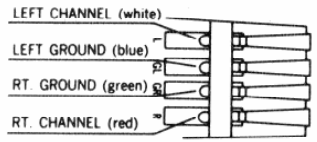


Fig. 6. Cartridge lead connections.

Connections to amplifier

1. The red phono cable is for the right channel, the yellow cable for the left channel.

2. Check for hum when your system is completely set up and working correctly. Turn amplifier volume up until you hear a hum (steady low-pitched tone.) Now touch the ground wire of your Dual to some of the chassis screws at the rear of the amplifier, which may have a special screw for this purpose. Listen for any difference in the loudness of the hum, and use whichever connection seems to give the least hum.

Connections to power supply

You can plug the line voltage cord of your Dual either into the convenience outlet on the back of your amplifier or directly into a house outlet. If the amplifier outlet is switched, this will allow the power to the Dual to be controlled by the amplifier's on/off switch. If you do this, don't shut the amplifier off until the Dual itself has shut off at the end of play, or the idler wheel may not disengage from the motor pulley and platter.

Note: Your Dual is equipped with a unique provision for controlling the power to the amplifier so that the entire system can be switched off automatically by the turntable after the last record has been played. If you wish to use this feature in your own system, consult your Dual dealer or a qualified serviceman, in accordance with UL requirements. The load on the power switch must not exceed 400 volt amperes.

Balancing the tonearm

1. With the tonearm locked and the stylus force and anti-skating dials set at 0, slip the shaft of the counterbalance onto the rear of the tonearm, guiding it on by the V-shaped track. Do not tighten the set-screw.

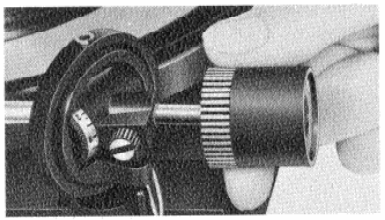


Fig. 7.

2. To make sure the operating switch is in "neutral," move the operating switch to "start," then rotate the platter by hand two or three times.

3. Unlock the tonearm, move it slightly in from the rest post and slide the counterbalance back and forth until the tonearm is approximately balanced for the weight of the cartridge. Then tighten the set-screw.

4. For fine balance, turn the counter-balance until the tonearm floats freely. (The counterbalance has been pre-set at a mid-position on its threads. If you ever find it too close to either end of its shaft, simply turn it in the opposite direction a few times.)

Applying stylus force

The numbers on the dial correspond to stylus force. Just turn to the number recommended for your cartridge. (See page 6 for some suggestions on applying stylus force for your particular cartridge.)

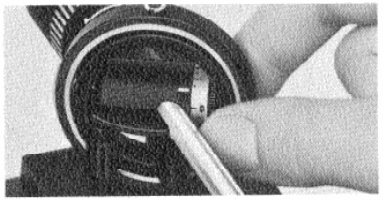


Fig. 8.

Applying anti-skating

Use the red scale for conical styli, the black scale for elliptical styli. (See page 7 for explanation of anti-skating.)

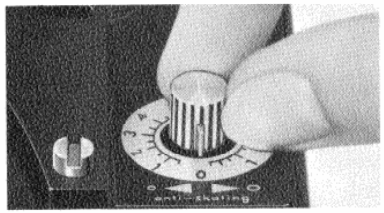


Fig. 9.

Setting vertical tracking angle

For single-play, turn 15° Selector to "S." For multiple-play, turn 15° Selector to "M." (See page 6 for explanation of vertical tracking angle feature.)

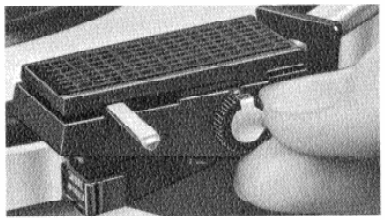


Fig. 10.

Adjustment for lead-in groove

If it is ever necessary to adjust the set-down position of the tonearm, this adjustment can be made with the indexing adjustment screw. This screw is accessible through the hole in the chassis (near the rest post) when the record size selector is set for 12" records. Turning this screw clockwise will move the set-down position of the tonearm toward the center of the record, and vice versa. The adjustment for the 12" record simultaneously applies for 7" and 10" records.

Adjustment for cycling height

This adjustment could be necessary only if the top of the tonearm head touched the bottom record of the stack during multiple-play. To lower the tonearm head, curing the cycling height adjustment knob clockwise. This knurled knob is located on the rear of the tonearm pivot, beneath the set-screw of the counterbalance.

Servicing

If your Dual ever requires servicing, ask your Dual audio dealer for the address of the nearest authorized service station. The address for Dual factory service is on the back cover.

Always ship your Dual in the original packaging, dismounted as when first received. If necessary, write for special shipping instructions.

Precision features

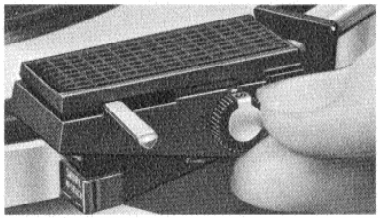


Fig. 11.

Perfect 15° tracking with unique 15° Selector

The 15° Selector provides zero tracking error in the single play mode. In multiple play, zero tracking error is provided at the center of the stack.

The "15° vertical" tracking angle is the angle at which records are cut, and thus the angle at which records should be played.

Tonearms without special provisions, such as 15° Selector, are designed to provide the correct angle only at the middle of the stack.

Four-point gyroscopic gimbal suspension

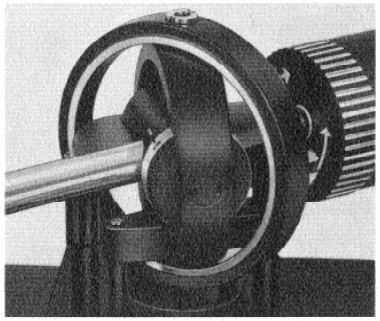


Fig. 12. Four-point gimbal suspension of the 1218 tonearm. Note that the tonearm pivots vertically from inner ring and pivots horizontally together with the inner ring from the outer ring. All four pivot bearings are identical.

The 1218's tonearm is suspended from an inner concentric ring that itself is suspended within an outer concentric ring. The tonearm pivots vertically from the inner ring. The tonearm and the inner ring together pivot horizontally from the outer ring, which remains stationary.

This ring-within-ring suspension is simply the definition of a gimbal, the suspension used for precision gyroscopes and other scientific instruments that require equal freedom of motion in all planes. The tonearm of the 1218 is centered and dynamically balanced within four suspension points, each designed with identical low-friction pivot bearings.

These bearings have such low friction that conventional instruments have difficulty in measuring them with any degree of accuracy. Measuring devices designed by Dual, and meticulous quality control checks, assure that the vertical bearing friction in every 1218 will be no more than 0.01 gram, and that horizontal bearing friction will be no more than 0.02 gram.

Elastically damped counterbalance

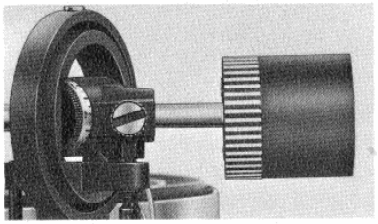


Fig. 13.

The counterbalance (together with its shaft) which compensates for the weight of the cartridge, is shifted behind the pivot for approximate balance. It is then locked in place, and the weighted section rotated for fine balance.

Every click you hear increases or decreases the balance by a specific amount, depending on which way you turn the weight. This special feature will come in handy for those owning more than one cartridge. If the weight difference between cartridges is within a reasonable number of click stops, balancing the tonearm from one to the other will be relatively simple.

The counterbalance is elastically damped from the shaft so as to effectively uncouple it from the tonearm.

Stylus force dialed directly to desired pressure

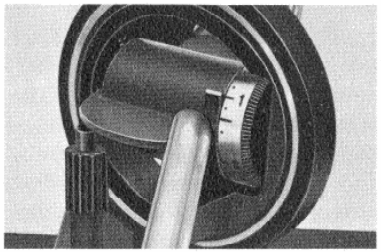


Fig. 14.

With the tonearm balanced for the particular cartridge in use, stylus force is applied by dialing to the amount desired.

When you turn the stylus pressure dial, the force itself is applied to the tonearm by a long spiral spring which acts directly around the pivot of the tonearm. The tonearm remains balanced, and even major deviations from perfect levelling of the chassis won't affect tracking.

Note: although the 1218 tonearm can track at a force as low as 0.5 gram, you should not actually attempt to track at so low a pressure. In all cases, the tracking ability of the cartridge you select will determine what is the best stylus force to use.

It is usually wise to set stylus pressure toward the higher end of the range suggested by the manufacturer of your cartridge. If loud passages with a good record sound clean, you can reduce the force slightly, but listen for the harshness or fuzziness that occurs with insufficient tracking force. Too light a tracking force produces distortion, and also produces groove skipping and excessive record wear. Too heavy a tracking force restricts the ability of the stylus to follow the contours of the groove and can also cause excessive record wear.

Separate anti-skating scales for conical and elliptical styli

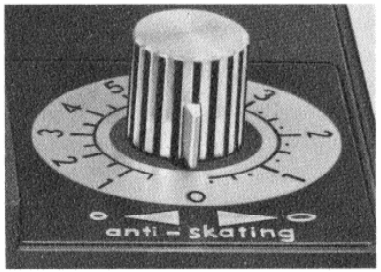


Fig. 15. Left scale is calibrated for 0.7 mil conical styli; right scale for all elliptical. For all practical purposes, these are sufficient. But for purists, Fig. 17 provides settings for different conical styli.

Skating refers to the tendency of the tonearm to move toward the center of the record faster than the decreasing spiral of the groove would normally move it.

Skating is actually not a serious problem with ordinary tonearms, as their bearing friction in the pivot is generally high enough to cancel out or to minimize the relatively small skating force.

But with tonearms with low bearing friction, skating does become significant. Distortion can result, as well as increased wear on the inner groove and on the stylus itself.

The objective of "anti-skating" is to apply an equal, precise, and opposite counterforce to the skating force. Among the factors to be considered

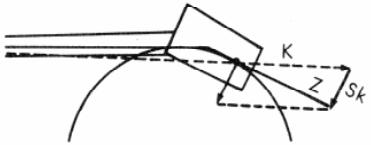


Fig. 16. Geometry of skating force originating in angled tonearm head. K is the theoretical direction of force against tone-arm bearing if head were not angled. Z is the actual direction of force against tonearm because of angled head. Sk is the resulting skating force.

in the design of an anti-skating device are the friction in the pivot bearings (a constant), the amount of tracking force (a variable) and the size of the stylus tip (also a variable.)

Bearing friction must not only be constant in principle, but must meet the same specifications in every unit if the anti-skating settings are to be accurate. Dual quality control sees to it that bearing friction in every 1218 is no higher than 0.02 gram in the horizontal plane and no higher than 0.01 gram in the vertical plane. And the anti-skating system is calibrated for these carefully checked constants.

Synchronous/hi-torque motor

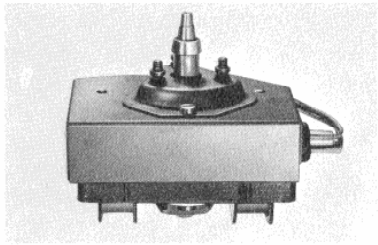


Fig. 18.

The synchronous/hi-torque motor is a newly developed type, designed and made by Dual. The high starting torque brings the platter up to full, stable speed in less than half a revolution, and the synchronous element maintains absolutely constant speed which is locked into the electric line frequency.

But constant and accurate motor speed still requires a precise drive system if the records are to rotate at the intended speed. The 1218's motor has a drive shaft with a precisely machined three-step pulley, one step for each speed: 33⅓, 45 and 78 rpm.

Stylus force	Stylus radius in mils					
	0.4	0.5	0.6	**0.7***	0.8	0.9
0.5	0.70	0.60	0.55	**0.5**	0.45	0.4
1.0	1.15	1.10	1.05	**1.0**	0.95	0.9
1.5	1.75	1.65	1.55	**1.5**	1.45	1.40
2.0	2.30	2.15	2.05	**2.0**	1.95	1.90
2.5	2.90	2.65	2.55	**2.5**	2.45	2.4
3.0	3.45	3.20	3.05	**3.0**	2.95	2.9
3.5	4.10	3.75	3.55	**3.5**	3.45	3.35
4.0	4.80	4.30	4.10	**4.0**	3.95	3.85
4.5	5.5	4.90	4.60	**4.5**	4.40	4.30
5.0	—	5.50	5.15	**5.0**	4.90	4.80

Fig. 17. Special anti-skating settings for conical styli with radii other than 0.7 mil. *Red scale is calibrated for 0.7 mil conical styli.

Idler wheel drive system

An idler wheel engages the selected step and simultaneously engages a flange on the underside of the platter. This sequence "reduces" the high rotary speed of the motor (1800 rpm) to one of the three standard record speeds, and filters out what

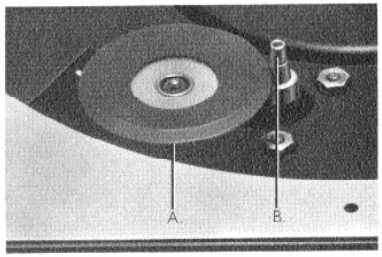


Fig. 19. Idler wheel (A) and motor pulley (B). In play, idler wheel engages flange on underside of platter and one of the steps of the motor pulley.

little vibration the motor itself produces. (The motor is suspended from the chassis by a radially-elastic mounting.)

When the 1218 is shut off, the idler wheel disengages automatically from the motor shaft and the platter, thus preventing flat spots from forming on the rim of the idler wheel. Such flat spots would otherwise cause audible thumps.

Pitch-control for "tuning" records

In addition to dead-accurate standard speeds, the 1218 allows each of these speeds to be varied within a 6% range for special purposes. This "tuning range" is equivalent to a musical semitone.

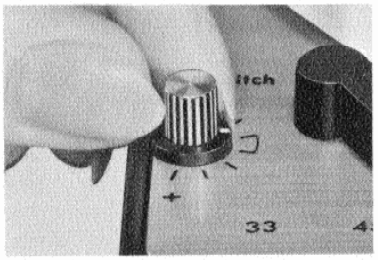


Fig. 20. Speed selector and pitch-control.

With the pitch-control, you can match the pitch of recorded music to live musical instruments or compensate for possible speed inaccuracies of your tape recorder. You can also "stretch" or "shrink" a recorded selection slightly to fit a length of motion picture film as another example.

These deliberate speed variations are accomplished by the idler wheel (Fig. 19A.) moving vertically along the tapered surface of each step of the motor pulley. (Fig. 19B.) There is no effect whatever on the speed or power of the motor.

One-piece cast platter

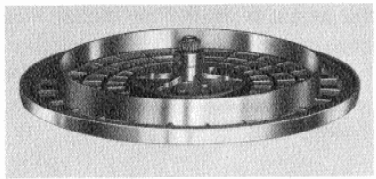


Fig. 21.

The platter is 10⅝ inches in diameter, and weighs 4 pounds. This weight, combined with the platter's centrifugal design, contributes substantially to the extremely low wow, flutter and rumble of the 1218.

It is cast from a single piece of non-magnetic alloy, which prevents certain types of magnetic cartridges from being drawn toward the platter while in play. The anti-static mat on the upper surface of the platter has special ribs to support each size record at its outer diameter.

Feather touch cue-control

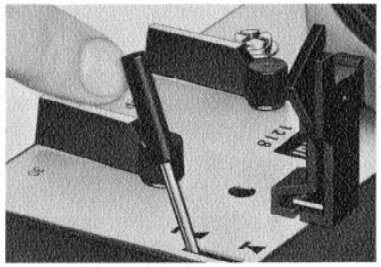


Fig. 22.

With the use of the cue-control, you can not only safely and gently begin play wherever you like, but interrupt play at any point and then resume where you left off. (The latter function comes in particularly handy when the phone rings.)

The 1218's cue-control is extremely precise and versatile. The vertical movement of the tonearm is silicone-damped. This provides a slow, gentle descent. Try working the lever hard and note how the tonearm responds.

The same slow descent can be used during automatic, as well as manual starts, by moving the cue-control lever to the "up" position before starting.

Single-play spindle rotates with record

Fig. 23.

The single-play spindle fits snugly into the platter and rotates with it, exactly as is done on manual turntables. By rotating with the record, instead of sitting loosely in the platter shaft, this spindle eliminates all possibilities of binding or eccentric record hole wear.

Multiple-play spindle with "elevator-action"

Fig. 24.

The multiple-play spindle, which holds up to six records, offers a number of unique features that provide unusually careful handling of your records as well as much convenience and flexibility.

If you use the multiple-play mode frequently, you will especially appreciate knowing that the spindle can be left in place instead of having to be removed each time records are removed.

If you look at the bottom record on the stack when you start the automatic cycle, you will note that it is first lowered from the other records on the stack above. This action removes all weight from the bottom record before it is released to the platter. Each step of the "elevator-action" is described in Fig. 25.

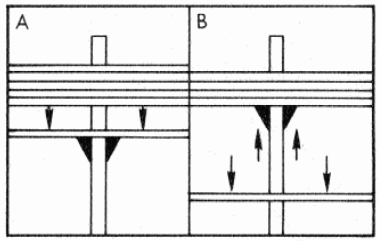


Fig. 25. How the "elevator-action" works. (A) Six records on stack. When operating switch is moved to "start," platform lowers with bottom record. Records above are held by grippers. (B) After bottom record is released to platter, platform opens and rises to support stack until next cycle begins.

Operating instructions

Fig. 26. Master operating switch for all start and stop functions in either single-play or multiple-play mode.

Foolproof design

Despite its versatility and precision, the Dual 1218 is quite easy to operate in either its single-play or multiple-play mode. It is also quite difficult to damage. If you happen to move the operating switch to "start" when the tonearm is locked on the resting post, just wait till the switch returns to "neutral," unlock the tonearm and start again. If the speed is set at 45 rpm when you have a 33 rpm record on the platter, just change the speed accordingly, even if the tonearm is already cycling. You can also do the same with the record size indicator. As for the variety of ways the Dual 1218 can be operated, they take longer to describe than to perform, so don't let the number of words that follow disturb you.

Single-play mode

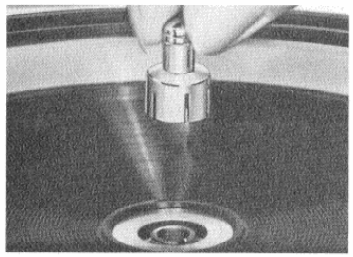


Fig. 27. Single-play spindle fits snugly into platter, rotates with record.

Insert the short spindle, set the 15° Selector for single play, and set the motor speed and record index switch for the record to be played.

Automatic start: Move the operating switch to "start." (The motor will start, the tonearm will rise, move over to the record and descend to play.)

Manual start: Lift the tonearm off its resting post and place it anywhere on the record. (The movement of the tonearm toward the record will start the platter rotating.)

Cue-control

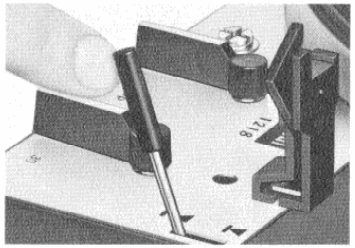


Fig. 28. Cue-control in "up" position allows tonearm to be placed anywhere over the record, or to be lifted from record without shutting motor off. A light touch of the lever shifts it to the "down" position, letting tonearm float down to the record.

Cue-control start: Move the cue-control lever to the forward position, then place the tonearm wherever you like over the record. Move the cue-control lever to the rear position (a light touch will do) and the tonearm will float down to the record.

To interrupt play when you intend to resume at the same place: move the cue-control forward. This will lift the tonearm from the record without shutting the motor off.

The ledge on the inward side of the resting post is for your convenience when flipping a record over. You can place the tonearm on the ledge out of the way of the record, without activating the automatic cycle.

Multiple-play mode

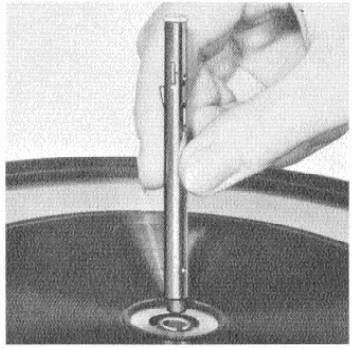


Fig. 29. Multiple-play spindle holds up to six records.

Set the 15° Selector for multiple-play. Insert the multiple-play spindle by placing the key at its base into the slot of the shaft. Then turn the spindle clockwise until it stops. The spindle can handle up to six records of the same size and speed.

All the functions as described above for single play are exactly the same in multiple play, plus these additions:

To reject a record during play and change to the next record on the spindle: turn switch to "start."

To replay a record on the platter: With no other record on the spindle platform above, just start normally, as in single play.

With another record on the platform, if you prefer to start automatically, first lift the record for replay back to the platform. Or you can leave it on the platter and start it manually, with or without the cue-control.

To repeat a record indefinitely: place the 45 rpm disc (supplied with your Dual) on the spindle platform after the record is on the platter. (You may find it advisable to place the weight of a record or two on top of the disc.)

There is never any need to remove the spindle for any such functions, since the supporting platform is designed to retract into the spindle when the records slip past.

Stopping play, either mode

To stop play: either turn the switch to "stop" or lift the tonearm from the record, either by hand or with the cue-control, and place it on the resting post. The motor will then shut off. At the end of play, the tonearm will return to its resting post automatically and the motor will shut off.

No matter what the mode of play, or how you started, you can stop at any time by any of the above means. (Don't be concerned about the continuing rotation of the platter. Its near-frictionless bearings let it go on and on.)